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HOWARD E. RHODES

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08/18/2004

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EXAMINER

MUNSON, GENE M

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 08/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/172,298

Applicant(s)

H. RHODES

Examiner

G. MUNSON

Group Art Unit

2811

AM

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE THREE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

☒ Responsive to communication(s) filed on 4 June 2004

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

☒ Claim(s) 1-4, 7-15, 18-23, 25-29, 31-39, 41-63, 65, 115-144 is/are pending in the application.

Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-4, 7-15, 18-23, 25-29, 31-39, 41-63, 65, 115-144 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some\* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

☐ Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other \_\_\_\_\_

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The process terminology (claims 31, 32, 38, 41, 42, 51, etc.) is considered only in terms of a necessary *resultant structure* from the process. The process itself is not at issue. The device claims are *not* limited to the recited process. See MPEP 2113; *In re Brown*, 173 USPQ 685 (CCPA 1972); *In re Fitzgerald*, 205 USPQ 594 (CCPA 1980); *In re Marosi*, 218 USPQ 289,292,293 (CCPA 1983); *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 7-13 and 120 are rejected under 35 U.S.C. 102 as unpatentable as shown by Anagnostopoulos et al. See Figures 3A, 3B, 3C. The "nitrogen containing second insulating" layer reads on an ONO layer or NO layer as in Anagnostopoulos et al. See present claims 9-13, which encompass an ONO layer or NO layer as the "nitrogen containing second insulating" layer, where an

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oxide layer is "in contact with said substrate", since an ONO layer has three sublayers: silicon oxide on silicon nitride on silicon oxide. The "first" & "second" gate stacks read on electrodes 32 with "photogate" 30. The "nitrogen containing second insulating" layer reads on an ONO layer (Figures 3A, 3B) or NO layer (Figure 3C) "in contact with said substrate and beneath said photogate" 30, that is "distinct from said first insulating" layer which reads on silicon oxide layer 36 (Figure 3A), on layer 43 (Figure 3B), and layer 52 (Figure 3C) beneath electrodes 32.

For claim 2, as an alternative, in Figures 3B, 3C, the "first" & "second" gate stacks read on electrodes 30 with "photogate" 32. The "nitrogen containing second insulating" layer reads on an ONO layer (Figure 3B) or NO layer (Figure 3C) "in contact with said substrate and beneath said photogate" 32, that is "distinct from said first insulating" layer which reads on silicon oxide layer 43 (Figure 3B), and layer 52 (Figure 3C) beneath electrodes 30.

Claims 1, 3, 7, 12, 14, 15, 18, 19, 26, 28, 29, 31-33, 38, 39, 41, 42, 44, 46, 51, 53, 55, 57-59, 115-125 and 135-139 are rejected under 35 U.S.C. 103 as unpatentable over the acknowledged prior art in this application (Figures 1, 2, pages 1-12) and Nagasaki et al, considered together. For an imaging device as in the acknowledged prior art (Figures 1, 2), it would have been obvious to use a photogate insulator with higher dielectric constant, as suggested by Nagasaki et al (Figures 3, 6, 17; columns 2-3), in order to increase the capacity of the photogate. From Nagasaki et al (column 2 lines 22-24, column 3, table 1), both silicon nitride and silicon oxide were conventional materials for use as a photogate insulator, which would have been obvious to use as a photogate insulator. From

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Nagasaki et al, it would have been obvious that the materials used in this invention, e.g., conventional silicon nitride as in claim 12, would achieve a higher capacity of the photogate than use of conventional silicon oxide. Thus, it would have been obvious to use conventional silicon nitride, as in claim 12, in order to achieve a higher capacity of the photogate than the use of conventional silicon oxide. From Nagasaki et al, it also would have been obvious that the materials used in this invention would achieve a lower capacity of the photogate than would use of tantalum oxide, because tantalum oxide has a higher dielectric constant than silicon nitride.

The conclusion is that the claimed invention as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the art. The hypothetical person of ordinary skill in the relevant art, familiar with all that the acknowledged prior art and Nagasaki et al disclose, "would have found it obvious to make a structure corresponding to *what is claimed*." *In re Sovish*, 226 USPQ 771, 774 (Fed. Cir. 1985).

Claims 2, 4, 25, 27, 43, 45, 54, 56, 126-134 and 140-144 are rejected under 35 U.S.C. 103 as unpatentable, the evidence being the acknowledged prior art in this application (Figures 1, 2, pages 1-12) and Nagasaki et al, applied as in the above rejection, further considered together with Koike et al. The claimed materials (claims 2, 4, 25, 27, 43, 45, 54, 56) are conventional to use as transparent or semi-transparent materials, as applicant would agree and as shown by Koike et al (column 3), which would have been obvious to use to achieve a transparent or semi-transparent photogate electrode. Note that "tin oxide" reads on SnO<sub>2</sub>. Moreover, it would have been obvious to have the photogate

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insulator extend over an adjacent "gate stack" (claims 126-134, 140-144) as the photogate insulator does over "gate stack" 18 of Koike et al (Figure 2), in order to achieve a photogate insulator and adjacent gate as in the acknowledged prior art in this application (Figure 1)

Claims 2, 8, 10, 11, 20, 22, 23, 25, 34, 36, 37, 43, 47, 49, 50, 54, 60, 62 and 63 are rejected under 35 U.S.C. 103 as unpatentable, the evidence being the acknowledged prior art in this application (Figures 1, 2, pages 1-12) and Nagasaki et al, applied as in the above rejection, further considered with Suzuki. The claimed materials (NO or ON), used by Suzuki (column 4), are well known to have a higher dielectric constant than silicon oxide, as applicant agrees (37 CFR 1.56, MPEP 2144.03), which would have been obvious to use for a photogate insulator in order to achieve a higher capacity for the photogate.

Claims 1-4, 7-15, 18-23, 25-29, 31-39, 41-63, 65, 115-125 and 135-139 are rejected under 35 U.S.C. 103 as unpatentable, the evidence being the acknowledged prior art in this application (Figures 1, 2, pages 1-12) and Nagasaki et al, applied as in the above rejection, further considered together with Okada et al and Anagnostopoulos et al. The claimed material (ONO), used by Okada et al and Anagnostopoulos et al, is well known to have a higher dielectric constant than silicon oxide, as applicant agrees (37 CFR 1.56, MPEP 2144.03), which would have been obvious to use for a photogate insulator in order to achieve a higher capacity for the photogate. Moreover, it would have been obvious to use a silicon nitride layer for a photogate insulator, because silicon nitride has a higher index of refraction which improves light transmittance through the gate electrode, and because

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silicon nitride blocks indium from leaching out of an indium tin oxide photogate and into the substrate (Anagnostopoulos et al, columns 3-4). Furthermore, it would have been obvious to use a silicon nitride layer to enhance reliability in terms of dielectric strength for a photogate insulator (Okada et al, column 12, lines 29-31).

Claims 126-134 and 140-144 are rejected under 35 U.S.C. 103 as unpatentable, the evidence being acknowledged prior art in this application (Figures 1,2, pages 1-12), Nagasaki et al, Okada et al and Anagnostopoulos et al, as in the above rejection, further considered together with Koike et al, applied as in the above rejection of these claims.

The references are of record.

The arguments in the response, filed 4 June 2004, have been considered but are not persuasive, as noted above. The response (pages 16-18) still does not point out any language in claim 1 that distinguishes over Anagnostopoulos et al, because an insulating layer beneath an electrode 30 is perforce distinct from an insulating layer beneath an electrode 32, even if those layers are subportions of a greater layer. Note for example that Alexandria is distinct from Arlington County even if both are subportions of Virginia. Claim 1 does not specify how the "second" layer is distinct from the "first" layer apart from being beneath the "photogate" rather than beneath the "first and second gate stacks."

Contrary to the response (pages 19-21), from Nagasaki et al (column 2 lines 22-24, column 3, table 1), silicon nitride and silicon oxide were conventional materials for use as a photogate insulator,

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and it would have been obvious to use conventional silicon nitride or conventional silicon oxide as a photogate insulator, and to use conventional silicon nitride as in claim 12, in order to achieve a higher capacity of the photogate than the use of conventional silicon oxide. It also would have been obvious that the materials used in this invention would achieve a lower capacity of the photogate than would use of tantalum oxide, because tantalum oxide has a higher dielectric constant than silicon nitride. Thus, this invention appears to be in accordance with the teachings of Nagasaki et al.

No claim is allowed.

This action is **FINAL**.

This action is a **final rejection** and is intended to close the prosecution of this application. Applicant's reply under 37 CFR 1.113 to this action is limited either to an appeal to the Board of Patent Appeals and Interferences or to an amendment complying with the requirements set forth below.

If applicant should desire to appeal any rejection made by the examiner, a Notice of Appeal must be filed within the period for reply identifying the rejected claim or claims appealed. The Notice of Appeal must be accompanied by the required appeal fee of appropriate amount

If applicant should desire to file an amendment, entry of a proposed amendment after final rejection cannot be made as a matter of right unless it merely cancels claims or complies with a formal requirement made earlier. Amendments touching the merits of the application which otherwise might



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not be proper may be admitted upon a showing a good and sufficient reasons why they are necessary and why they were not presented earlier.

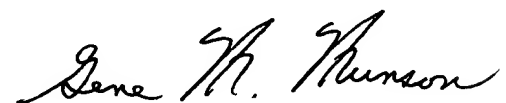
A reply under 37 CFR 1.113 to a final rejection must include the appeal from, or cancellation of, each rejected claim. The filing, whichever is longer, of an amendment after final rejection, whether or not it is entered, does not stop the running of the statutory period for reply to the final rejection unless the examiner holds the claims to be in condition for allowance. Accordingly, if a Notice of Appeal has not been filed properly within the period for reply, or any extension of this period obtained under either 37 CFR 1.136(a) or (b), the application will become abandoned.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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8/12/04



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